Department of Defense Energy Management Program

CDR Rob Tomiak

17 August 2005

Energy Management

- Decentralized facilities energy program
  - Component headquarters provide guidance and funding
  - Installations manage site-specific energy and water conservation programs
- Military installations are responsible for:
  - Maintaining awareness
  - Developing and implementing projects
  - Ensuring that new construction meets sustainable design criteria

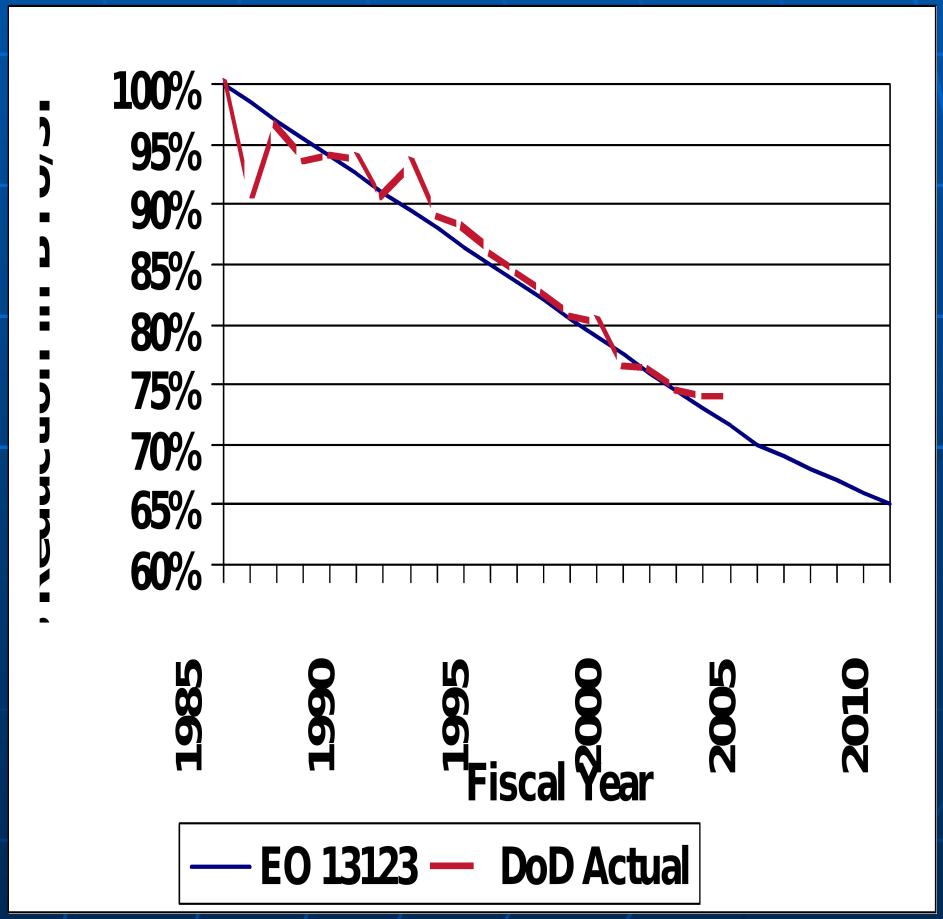
New Energy Bill

- New Energy Reduction Goals
  - All Facilities – 2% per year
- Metering by 2012
- Procurement of Energy Efficient Products
- ESPC Authority Extended Until 2016
- Building Performance Standards
  - 30% below ASHRAE
- New Renewable Energy Goals

Energy Management Conservation

- **DoD Reduction goals**
  - Building energy use per GSF down 35% from 1985 by 2010
  - Industrial energy use per GSF down 25% from 1990 by 2010
- **Progress: Veering?**
  - Building: Down 26.8%
  - Industrial: Down 13.3%
- **New 2% Goal**
  - Do you have a Strategy?

Standard Facility Reduction Goals verse Actual Usage



DoD Energy Conservation Strategy

- Energy Awareness Campaigns
- Facility Energy Audits
  - Metering
  - Benchmarks
- Energy Efficient Investments
  - Congressional Appropriations
    - MilCon / Service O&M
  - Private Sector Investment
- Sustainable Design
  - Life-cycle Cost Analysis
- Renewable Energy Technologies

Usage/Demand

Analysis

Funding

Execution

Planning & Design

Security & Flexibility

FEMP's Industrial Facilities Initiative for DOD All – Hands Meeting

Oak Ridge National Laboratory

Julia Kelley

OAK RIDGE NATIONAL LABORATORY
U. S. DEPARTMENT OF ENERGY

Industrial Facilities Initiative (IFI)

- **Partnership between FEMP and DOE's Industrial Technologies Program (ITP)**
  - **Started through agreement between FEMP and ITP in 2000 following an assessment at the Bremerton Naval Shipyard**

- **Serving federal industrial customers wit technical expertise from:**
  - **Oak Ridge National Laboratory (ORNL)**
  - **Industrial Assessment Centers (IAC)**
  - **BestPractices (BP) Specialists**
- **Since 2001, over $4M in energy savings identified by FEMP IFI assessments at federal industrial sites**
- **FEMP website for IFI**
  - **www.eere.energy.gov/femp/technologies/industrial_facilities.cfm**

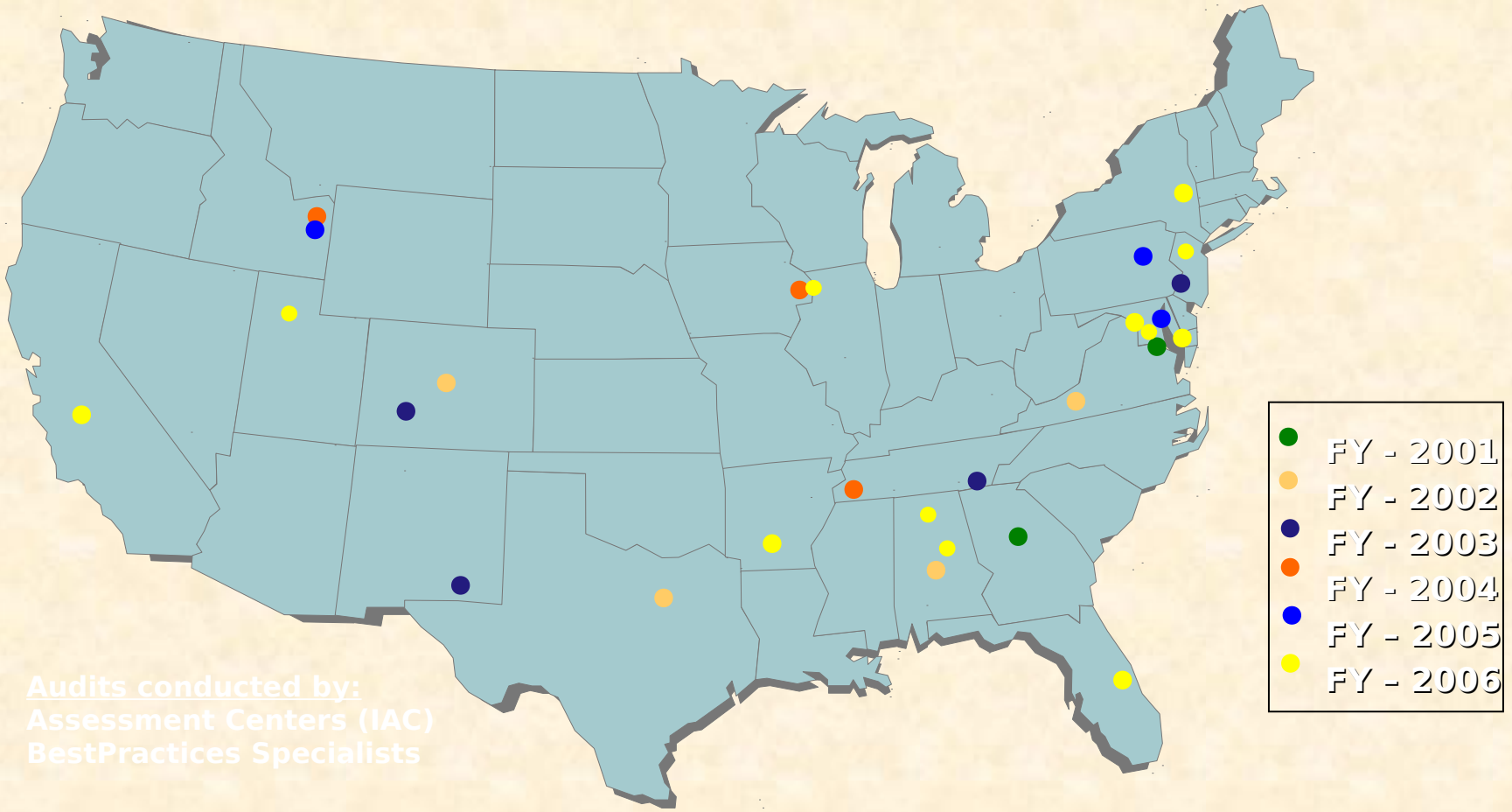
FEMP IFI Services Available to DOD

- **Assessments**
  - One or two day site visit
  - Baseline Performance Measurements are taken
  - Energy and cost savings recommendations are made
  - Estimates of energy savings, energy cost savings, and implementation costs are also generated
  - Comprehensive, all energy systems
  - Targeted, specific systems
- **DD-1391 assistance for specific recommendations**
- **Report review**
- **Assessment follow-up**
  - Implementation options
  - Identification of other opportunities for FEMP assistance
- **Training and Resources**
  - Steam
  - Compressed Air
  - Process Heating
  - Pumping
  - Motors

Technical Resources Available

- **University-based Industrial Assessment Centers (IACs)**
  - **Comprehensive, first order look at all energy systems**
- **Best Practices (BP) Assessment Teams**
  - **Targeted assessments of steam, compressed air, pumping and motor systems**
- **Publications**
  - http://www.oit.doe.gov/bestpractices/library.shtml
- **Software Assessment Tools**
  - http://www.oit.doe.gov/bestpractices/software_tools.shtml
  - http://iac.rutgers.edu/database/
- **Training**
  - http://www.oit.doe.gov/bestpractices/textCalendar.shtml
  - **End User**
  - **Qualified Specialists**

FEMP Industrial Facilities Program Sites - FY 01 thru FY 05 Including Candidates for FY06



Assessment History

- **FY 2001**
  - **USPS Crown Road P&DC, Atlanta – *Georgia***
    - Comprehensive Assessment
  - **Bureau of Engraving and Printing (Treasury) – *WDC***
    - Comprehensive Assessment
    - With Steam and Compressed Air System-Specific Assessments
- **FY 2002**
  - **Radford Army Ammunitions Plant (DOD-Army) – *Virginia***
    - Steam and Compressed Air System-Specific Assessments
  - **Denver Mint (Treasury)- *Colorado***
    - Comprehensive Assessment
  - **Western Currency Facility (Treasury) – *Texas***
    - Comprehensive Assessment
  - **USPS Birmingham - *Alabama***
    - Comprehensive Assessment

Assessment History - continued

- **FY 2003**
  - **Waste Isolation Pilot Plant (DOE) – *New Mexico***
    - Compressed Air System-Specific Assessment
    - Includes Water Assessment
  - **Philly Mint (Treasury) – *Pennsylvania***
    - Comprehensive Assessment
  - **Fort Carson (DOD-Army) - *Colorado***
    - Compressed Air System-Specific Assessment
  - **USPS Chattanooga - *Tennessee***
    - Comprehensive Assessment

- **FY 2004**
  - **Idaho National Engineering and Environmental Lab (DOE) - *Idaho***
    - Compressed Air System-Specific Assessment
  - **Memphis IRS (Treasury) - *Tennessee***
    - Comprehensive Assessment
  - **Rock Island Arsenal (DOD-Army) - *Illinois***
    - Comprehensive Assessment

Assessments - FY 2005

- **Idaho National Engineering and Environmental Lab (DOE) - *Idaho***
  - Compressed Air System-Specific Assessment
- **Baltimore Coast Guard Yard (DHS) – *Maryland***
  - Compressed Air System-Specific Assessment
- **Tobyhanna Army Depot (DOD-Army) – *Pennsylvania***
  - Comprehensive Assessment
- **McAlester Army Ammunitions Depot (DOD-Army) – O*klahoma***
  - Steam System-Specific Assessment consideration
- **Port Hueneme (DOD-Navy) – *California***
  - CFD funding assistance consideration
- **DOD Final Candidate**
  - *To Be Determined*

Estimated and Implemented Savings from Projects

Year	Project Title	Estimated Annual Cost Savings ($)	Implemented Annual Cost Savings ($)	% Implemented
2001	USPS Crown Rd P&DC - Atlanta	$ 73,476	$ 21,021	29%
2001	Bureau of Engraving and Printing	$ 725,963	$ 285,977	39%
2002	Radford Ammunitions Plant	$ 377,500	$ 290,000	77%
2002	Denver Mint	$ 73,620	$ 36,000	49%
2002	Western Currency Facility	$ 328,882	$ 58,066	18%
2002	USPS Birmingham	$ 43,299	$ 3,400	8%
2003	DOE Waste Isolation Pilot Plant	$ 41,832	$ 41,832	100%
2003	Philly Mint	$ 963,131	$ 201,648	21%
2003	Ft Carson	$ 89,000	$ 29,000	33%
2003	USPS Chattanooga	$ 32,886	Follow-up Pending	
2004	Rock Island	$ 878,538	$ 309,944	35%
2004	IRS-Memphis	$ 251,826	$ 224,031	89%
2004	INEEL Compressed Air (1 of 2)	$ 160,000	$ 128,782	80%
	Totals	**$ 4,039,953**	**$ 1,629,701**	**40%**

*Includes funding submittals pending approval

DOD Sites Recommendations Summary

Site	Expected Cost Savings	Expected Energy Savings*	Estimated Implementation Costs	Simple Payback
Radford Army Ammunitions Plant, VA	$377,500	19,272 MMBtu	Not Available	Not Available
Fort Carson, CO	$89,000	18,827 MMBtu	$79,650	1 Yr
Rock Island Arsenal, IL	$878,538	167,512 MMBtu	$1,968,600	2.3 Yrs
Tobyhanna Army Ammunitions Depot	unknown	unknown	unknown	unknown
Total	$1,345,038	205,611 MMBtu	$2,048,250	

*Source Energy Savings

DOD Sites Implementation Summary

Site	Recommended Savings	Implemented Savings*	Recommendation Comments
Radford Army Ammunitions Plant, VA	$377,500	$290,000	2 Implemented, 2 for Future Implementation
Fort Carson, CO	$89,000	$29,000	1 Implemented, 2 for Possible Future Consideration
Rock Island Arsenal, IL	$878,538	$309,944	5 Implemented or Planned; Others Unsure
Tobyhanna Army Ammunitions Depot	Electricity and Natural Gas	unknown	Report Pending
Total	$1,345,038	$628,944	48% Implemented

* Savings based on Assessment Report, M&V not available.

DOD Sites
Energy Savings Summary

Site	Recommended Savings	Implemented Savings*	Energy Savings Comments
Radford Army Ammunitions Plant, VA	19,272 MMBtu	23.3 MMBtu	Electricity and Natural Gas Savings
Fort Carson, CO	18,827 MMBtu	6,135 MMBtu	Electricity Savings
Rock Island Arsenal, IL	167,512 MMBtu	113,760 MMBtu	Electricity, Coal, and Productivity Savings; Natural Gas Expenditure
Tobyhanna Army Ammunitions Depot	Electricity and Natural Gas	unknown	Report Pending
Total	205,611 MMBtu	119,918 MMBtu	58% Implemented

*Source Energy Savings, Includes Pending Funding Approval

What Makes a Good Candidate?

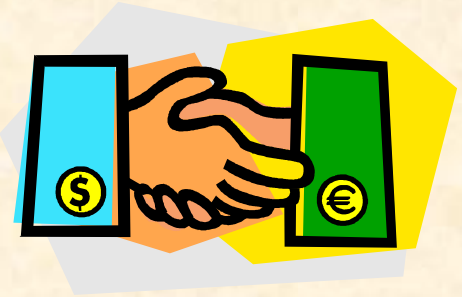
- **Industrial Facility**
  - **Process or manufacturing**
    - **Arsenals, Depots, Bases, etc.**
  - **Part of Energy-Intensive category for Annual Report to Congress**
    - **Energy Management Data Report**
- **Site Champion**
- **Savings Potential**
- **Funds to Implement**
  - **Appropriations**
  - **Alternative Financing (ESPC, UESC)**

DOD Candidates Considered for FY06

- **Pine Bluff Arsenal – *Arkansas***
- **Marine Corp Logistics Base – Barstow – *California***
- **Naval Aviation Depot – Jacksonville – *Florida***
- **Naval Sea Warfare Center – Indian Head – *Maryland***
- **Marine Corp Base – Albany – *New York***
- **Hill Air Force Base – *Utah***
- **Naval Research Laboratory - *WDC***
- **Anniston Army Depot - *Alabama***
- **Redstone Arsenal – *Alabama***
- **Rock Island Arsenal – *Illinois***
- **Aberdeen Proving Grounds – *Maryland***
- **Picatinny Arsenal – *New Jersey***

Thanks!

- **We appreciate the enthusiastic response from DoD!**



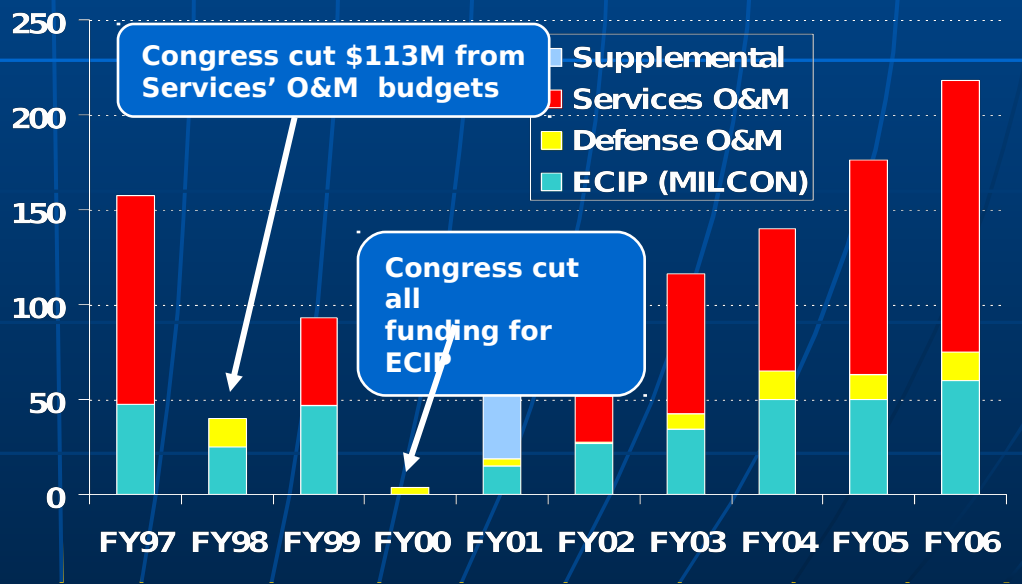
- **Any others out there?**

IFI Contacts

- **Melissa Madgett (Technical Lead)**
  - Telephone: 865-576-3373
  - Fax: 865-574-3851
  - Email: madgettmg@ornl.gov
- **Julia Kelley (Commercial Buildings Group Leader)**
  - Telephone: 865-574-1013
  - Fax: 865-574-3851
  - Email: kelleyjs@ornl.gov

Energy Management Funding

- Installation energy costs have risen greatly
  - DoD facilities spent $2.8B on energy in FY04
- Saving energy saves money, but
  - Funding has been inconsistent
  - Rely heavily on private-sector shared savings contracts



Energy Management

Energy Conservation Investment Program (ECIP)

- **Historically**
  - Produce $3-$4 life-cycle savings for every $1 invested
- **Process**
  - Programmed $60 M in FY 06 Presidential Budget
  - Funding allocated by usage and past ECIP obligation rates
  - Component priorities (SIR, payback, BTU reduction, etc.)
  - 10 USC 2865: Congressional notification prior to execution
- **Issues**
  - Funding increased over the past few years
  - Congressional earmarks complicate program
  - New!!!: DoD Instruction encourages renewable projects
  - Funding of Renewable Energy Project on the Increase!
    - FY 03: $5M FY 04: $11M FY 05: $13M FY 06: $18M

Energy Management

Private Sector Investments

- **Share-in-saving contracts**
  - **Energy Savings Performance contract (ESPC)**
    - **Energy Service Company (ESCO)**
    - **Guaranteed savings**
    - **Measurement & Verification (M&V) required**
  - **Utilities Energy Service Contracts (UESC)**
    - **Local utility**
    - **M&V not required**

	2001	2002	2003	2004
Number of Awards	74	73	64	25
Annual Savings (trillion BTU)	2.1	2.2	4.2	0.95
Total Savings ($M)	729	836	826	106

Energy Management

Annual Energy Reporting

- Required by Executive Order 13123 and National Defense Authorization Act for FY 2002
- OMB/DoE guidance
  - OMB Circular A-11 (October)
  - Scorecard and Data Report (October)
  - Narrative & revised A-11 (November)
  - Implementation Plan (November)
- Future Focus
  - Showcase Facilities
  - Distributed Energy Resources
  - Renewable Energy
- Pending Legislative Change: Energy Policy Act of 200X?
  - Change Building and Industrial Baseline to 2000
  - Change annual reduction goal to 2%

Energy Management

Future Focus

- Metering and Commercial Benchmarks
- Strategic Investment Plan
- RPS/BOS Requirements Model
- Increased use of ESPC Contracts
  - Replication Pilot Project
  - Process Improvement
- Renewable Energy Strategy
- Inter-DoD Partnerships

DOD Renewable Replication Pilot ESPC

- Objectives
  - Use high potential renewable technologies from DOD Renewable Energy Assessment
  - Demonstrate broad replication of solar applications at DOD sites
  - Centralized procurement for geographic region of DOD sites
  - Ease energy managers access to alternate finance (ESPC) contracts

Solar Technologies Selected

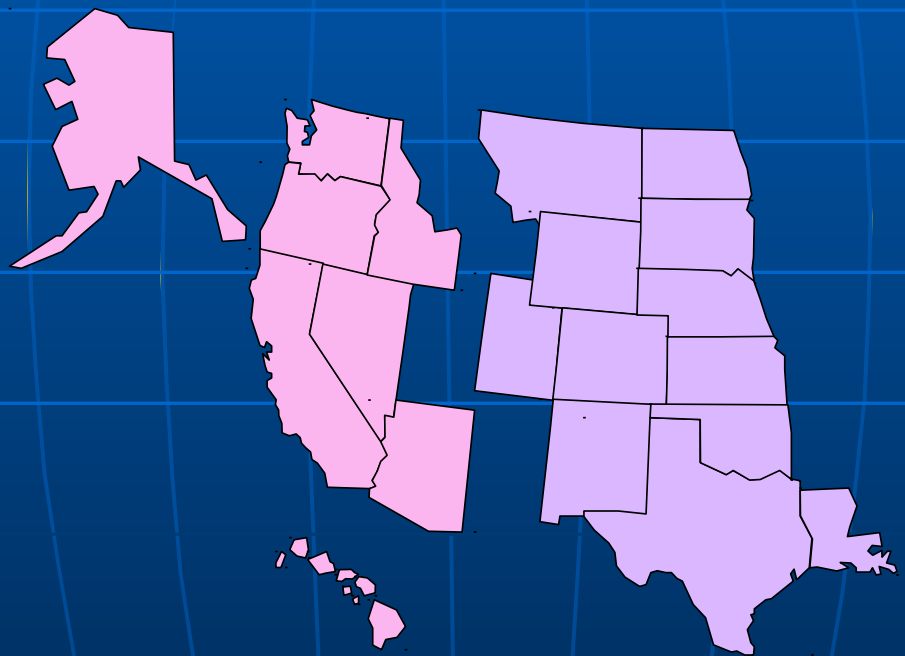
Daylighting & Lighting Controls

Transpired Solar Collectors

Swimming Pool Heating

Grid-Connected Photvoltaics

ESPC Geographic Scope



DOD Renewable Replication Pilot ESPC

- DOD Installation Data Call
  - Sites in Geographic Region
  - General site Information
  - Fuel/Energy Rates
  - Facility information to conduct economic feasibility/screening
- DOE Team screen to identify DOD solar application potential
  - Generally 10 year payback
  - Including financial incentives/tax credits

DOD Renewable Replication Pilot ESPC

- Draft Technology and Data Collection Package Available
- Posted on DOE Website
  - http://www.eere.energy.gov/femp/technologies/renewable_projectimplement.cfm
- Facility Managers complete Excel Spreadsheet

Questions?

http://www.acq.osd.mil/ie/irm/Energy/Energy.htm

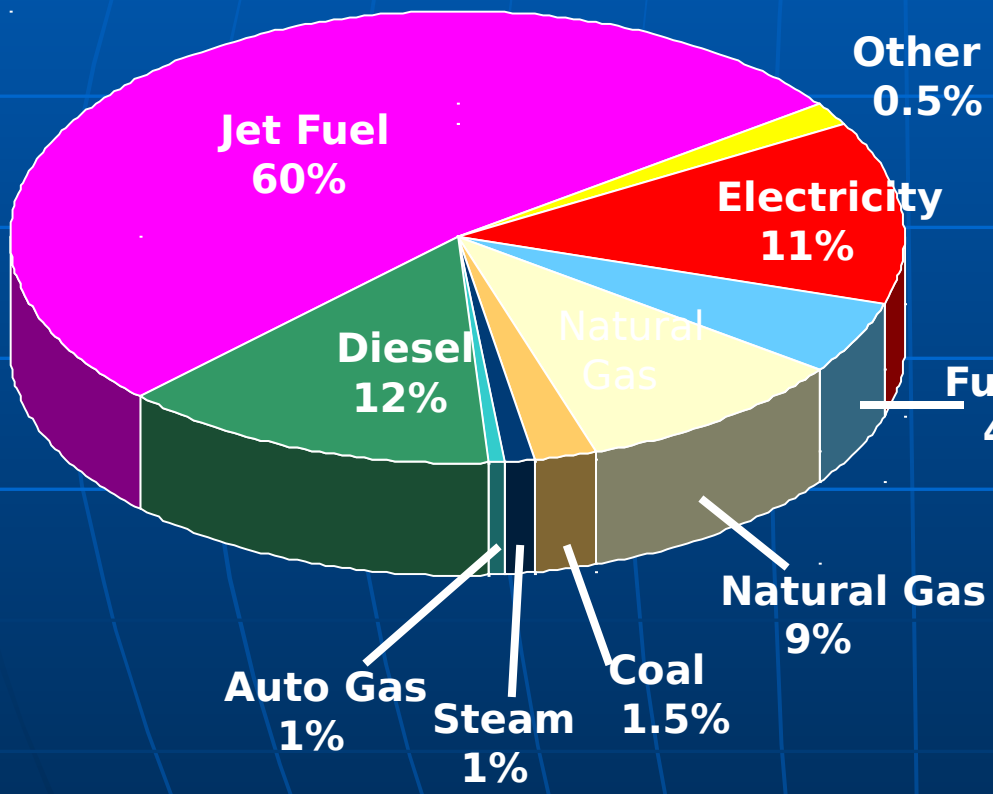
CDR Rob Tomiak, robert.tomiak@osd.mil, (703) 571-9074

Backup Slides

FY04 DoD Energy Use

Total Site-delivered Energy (BTU)

Commodity

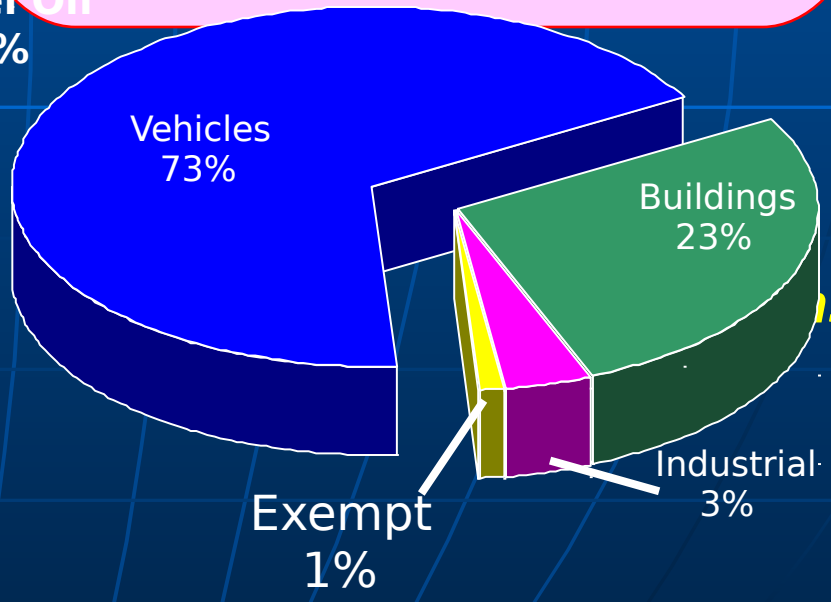


$8.2B

948 Trillion BTU

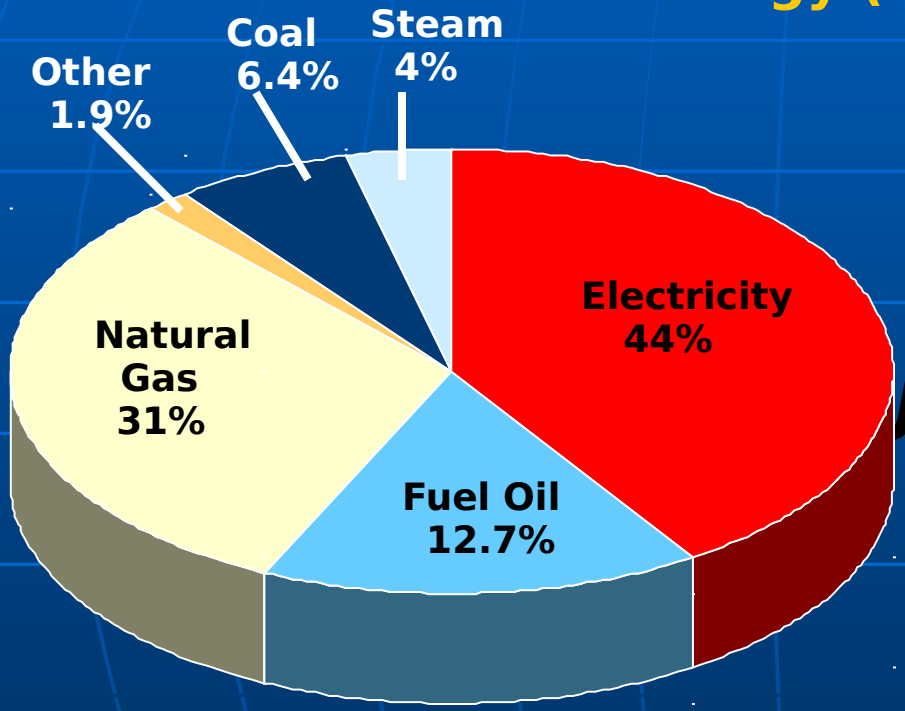
Nation's single largest energy user ***(1% of total U.S. energy use & 78% of Federal energy use)***

Application



FY04 Installation Energy Use

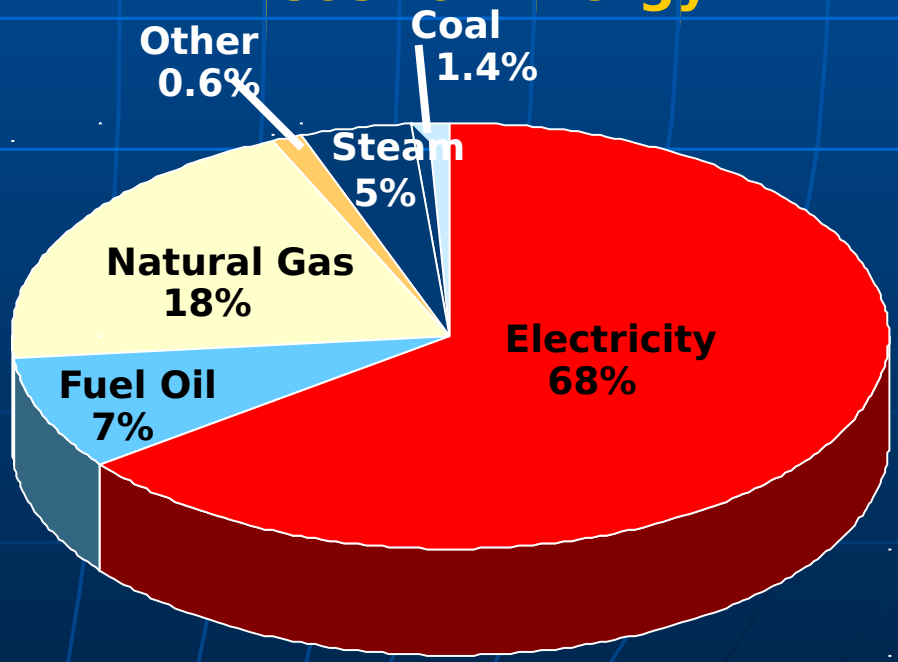
Site-delivered Energy (BTU)



From FY03

- Electricity use up 3% cost *steady*
- Natural gas use *down* 8% cost *down* 1.4%
- Fuel oil use down 8% cost *down* 17.7%

Cost of Energy



Executive Order 13123

- Reduce greenhouse gases by 30%
  - By 2010 based on 1990
  - Based on source energy
- Reduce building energy per GSF
  - 30% by 2005; 35% by 2010
  - 1985 baseline
- Reduce industrial/lab energy
  - 20% by 2005; 25% by 2010
  - 1990 baseline
- New, stricter exempt facility guidelines
- Include energy funding in budget
- Agency scorecards

Executive Order 13123 (cont)

- ENERGY STAR© label
  - Shall select products, where cost-effective
  - Strive to meet building criteria
- Sustainable design to optimize buildings
- Expand renewable energy use
- Electricity
  - Take advantage of competitive markets
    - Aggregate demand
  - Seek high-efficiency and green power
  - Renewable electricity sources
    - Evaluate and report current use
    - Adopt policies to increase use

DoD Energy Conservation Strategy

- Existing structures
- Maximize use of ESPC (Energy Savings Performance contracts) and UESC (Utility Energy Savings Contracts)
- Limited appropriated funding (POM $50M/year)
  - Primarily ECIP (Energy Conservation Investment Program)
  - FY 2000 - $4.0M ($0.0 for ECIP)
  - FY 2001 - $15.0M
  - FY 2002 - $27.0M
  - FY 2003 - $34.5M
  - FY 2004 - $50M
  - FY 2005 - $50M
  - FY 2006 - $60M (in budget request)
- New buildings
  - Sustainable design (Whole Building Design Guide)
- Renewable Energy
  - Wind, Solar, Geothermal

Energy Management

Facility Carbon Emission

For FY04

- **Building/facilities - 34.9 %**
- **Energy Intensive – 24 %**
- **Combined Facilities – 33.6 %**

DoD Carbon Emission from Facilities